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Mach. 81-C-5
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H-2061-ARA-8-55

19 August 1955

File RD-91

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Subject: Conference with [redacted] and
[redacted] Representatives
on 9 August 1955 and 12 August 1955 Concerning
the Passive Intercept Receiver System

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The following were in attendance all or part time on
9 August 1955:

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The following were in attendance on 12 August 1955:

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The following points were discussed and design objectives
were agreed upon or were to be discussed in the future.

I Antenna and Detector System

1. The bands are to be rearranged as follows:

Band 1	50 - 110 Mc
2	110 - 250 Mc
3	250 - 500 Mc
4	500 - 1000 Mc
5	1 - 2.2 Kmc
6	2.2 - 4.5 Kmc
7	4.5 - 10 Kmc
8	10 - 20 Kmc
9	20 - 40 Kmc

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2. The half power antenna beamwidth shall be between 80° and 105° .
3. Horns of NRL design shall be used for Bands 6, 7, 8 and 9. Pattern measurements of these horns indicate a deficiency in meeting the beamwidth requirements stated above, however, the designs will be employed in the interest of expediency.
4. The overall antenna pattern of the four units in each band shall be such that there is maximum directivity in the forward, stern, starboard and port directions. The minimum points shall occur symmetrically along 45° lines bisecting the right angles between the points of maximum directivity. A typical clover leaf pattern is the result desired.
5. The antenna gain objectives are as follows:
 - 5 db for low bands
 - 8 db for middle bands
 - 11 db for high bands
6. The requirement for antenna matching is to have the VSWR as low as possible consistent with all other factors.
7. The polarization desired is ideally circular, however, in the interest of expediency the following shall be considered acceptable dependent upon the choice of antenna type:
 - Horns - 45° polarization
 - Helices - Circular polarization
 - Discones - Vertical polarization
 - Dipoles - Vertical polarization
 - Spiral - Circular polarization
8. Due to the physical size it is desirable to obtain one antenna type to cover the frequency range of Bands 1 and 2. If this is possible, filters will be used to separate Bands 1 and 2 for presentation. This will not be considered added scope. However, filters required for any other bands or frequency ranges will be considered added scope.
9. The problem of squint angle in the antenna pattern, which is characteristic of some helical types, was discussed. Since the problem was absent in any of the many forms of tapered helices built by it was dismissed. This problem was considered no drawback to the use of tapered helices designed by for use on this project.
10. The problem of beam tilt was discussed. It is proposed that the maximum effort be made to keep the beam tilt as low as possible over the frequency range of each band consistent with the final usage to be made of the system for direction finding.

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11. Effort will be made to provide crystal diodes and holders which will be optimum for the antenna type used for each band. The objective is to obtain maximum tangential sensitivity with a minimum receiver noise figure.
12. Crystal shutters will be provided by ☐ on each band to protect the system. The form to be used is dependent upon the choice of antenna type and the method of packaging. 25X1
13. The desired packaging form for the antenna system is conical or a reasonable approximation thereof. Cylindrical and pyramidal forms are secondary choices.
14. A primary objective in the packaging phase is camouflaging the complete unit. Until the low band antenna types are chosen, no effective work can be done toward the solution of the problem. However, in the construction of the antenna unit everything will be done toward making camouflaging easier.
15. The antenna system shall be designed to meet specification MIL-E-16400, Class 2 where applicable.
16. Since it is intended to mount the antenna structure on a movable mast, the minimum height being 7 feet and the maximum height being 17 feet, the design will be such as to take into account stresses due to wind and the associated problems of mast travel and cable travel.
17. It is desired that the maximum base diameter of the antenna unit be 12 feet.
18. It is desired to have a single battery for supplying power to the pre-amplifiers mounted in the antenna unit for the sake of simplicity in maintenance.

II Console Unit

1. The video circuits to the plates of the indicator tubes shall be linear.
2. The amplifier for driving the recorder shall be logarithmic with a dynamic range of 20 db.
3. The output signal for recorder or audio use shall make use of pulse stretching techniques.
4. The pulse stretching control circuits shall be readily disabled at the operator's discretion.
5. The output level available for recording shall be one milliwatt across 100 ohms.

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6. There is available for use a source of 110 volts - 60 cycle power.
7. There is also available means for charging batteries from the power source.
8. Since the Tektronix 513D originally proposed in T.P. No. 651 is no longer available, it is agreed that the Tektronix 514-AD will be ordered.
9. It has not yet been agreed which of the three phosphor types (P1, P7 and P11) would be of maximum use in the operation of the oscilloscope, both for visual observation and photographic recording.
10. It has been agreed that a P7 phosphor for the monitor tubes is a good compromise between visual and photographic observation.
11. Since it is desirable to photograph the console unit panel when it is unmanned, the following will be necessary and will be supplied by the customer for each system.
 - 1 - Navigation clock
 - 1 - Gyro compass
12. Means shall be provided to actuate the camera for photographing the console unit panel. Information as to signal level and form of signal required for actuation will be supplied by the customer.
13. There will be provided ten individual output signals for recording purposes. This will include one output signal from each of the nine bands and one combined output signal.
14. The output signal to the oscilloscope and for audible usage shall be combined and will be available simultaneously at the same terminal.
15. Since the rearrangement of the bands, the following video bandwidths are required:
 - Band 1 - 750 Kc
 - 2 - 750 Kc
 - 3 - 750 Kc
 - 4 - 750 Kc
 - 5 - 4 Mc
 - 6 - 4 Mc
 - 7 - 4 Mc
 - 8 - 12 Mc
 - 9 - 12 Mc
16. The unit will be designed to meet specification MIL-E-16400, Class 2.

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